What is claimed is:

1. A fuel injector, the fuel injector comprising:

a housing having a first housing end and a second housing end extending along a longitudinal axis, the housing having an end member located at one of the first housing end and second housing end;

a length-changing actuator disposed along the longitudinal axis;

a closure member coupled to the actuator, the closure member being movable between a first configuration permitting fuel injection and a second configuration preventing fuel injection; and

a compensator assembly that moves the length-changing actuator with respect to the housing in response to temperature changes, the compensator assembly including:

a body having a first body end and a second body end extending along a longitudinal axis, the body having an inner surface facing the longitudinal axis;

a first piston coupled to the length-changing actuator and disposed in the body proximate one of the first body end and second body end, the first piston having a first outer surface and a first working surface distal to the first outer surface, the first outer surface cooperating with the end member to define a first fluid reservoir in the body;

a second piston disposed in the body proximate the first piston, the second piston including a second outer surface distal to a second working surface that confronts the first working surface of the first piston;

a first sealing member coupled to the second piston;

a flexible fluid barrier coupled to the first piston and the second piston, the flexible fluid barrier cooperating with the first and second working surface to define a second fluid reservoir; and

a first spring member and a second spring member, each of the first and second spring members being contiguous to the second outer surface of the second piston so as to move at least one of the first piston and the second piston along the longitudinal axis.

2. The fuel injector of claim 1, wherein the first piston comprises an exterior first piston surface confronting the body inner surface so as to provide a controlled clearance that permits fluid communication between the first and second fluid reservoirs.

3. The fuel injector of claim 1, wherein the first sealing member comprises an O-ring disposed in a groove formed on a peripheral surface of the second piston such that the O-ring is contiguous to the body inner surface.

4. The fuel injector of claim 1, further comprising a valve disposed in one of the first and second reservoir, the valve being responsive to one of a first fluid pressure in the first fluid reservoir and a second fluid pressure in the second reservoir so as to permit fluid flow from one of the first and second fluid reservoirs to the other of the first and second fluid reservoirs.

5. The fuel injector of claim 1, wherein the second piston comprises an annulus disposed about the longitudinal axis, the annulus including a first surface proximal the longitudinal axis and a second surface distal therefrom.

6. The fuel injector of claim 5, further comprising an extension extending through the annulus, the extension having a first end and a second end, the first end being coupled to the first piston and the second end being coupled to the length-changing actuator, the second end including a boss portion.

7. The fuel injector of claim 6, wherein the second sealing member comprises a bellows having first end hermetically coupled to the first surface of the annulus and a second end being coupled to the boss portion of the extension.

8. The fuel injector of claim 7, further comprising a fluid passage disposed in one of the first and second pistons, the fluid passage permitting fluid communication between the first and second fluid reservoirs.

9. The fuel injector of claim 8, wherein the first spring member includes one terminus being coupled to the boss portion and another terminus contiguous to one of the first and second pistons so as to impart a first spring force to the one of the first and second pistons.

10. The fuel injector of claim 8, wherein the second spring member includes one terminus engaging a boss portion formed on the body inner surface and another terminus contiguous to one of the first and second pistons so as to impart a second spring force to the one of the first and second pistons.

11. The fuel injector of claim 10, wherein the first piston comprises a first surface area in contact with the fluid and the second working surface comprises a second surface area in contact with the fluid such that a resulting force is a function of the sum of the force of the first and second spring members, a seal friction force and a ratio of the first surface area to the second surface area.

12. A hydraulic compensator for an length-changing actuator, the length-changing actuator having first and second ends, the hydraulic compensator comprising:

an end member;

a body having a first body end and a second body end extending along a longitudinal axis, the body having an inner surface facing the longitudinal axis;

a first piston coupled to the length-changing actuator and disposed in the body proximate one of the first body end and second body end, the first piston having a first outer surface and a first working surface distal to the first outer surface, the first outer surface cooperating with the end member to define a first fluid reservoir in the body;

a second piston disposed in the body proximate the first piston, the second piston having a second outer surface distal to a second working surface confronting the first working surface of the first piston;

a first sealing member coupled to the second piston;

a flexible fluid barrier coupled to the first piston and the second piston, the flexible fluid barrier cooperating with the first and second working surface to define a second fluid reservoir; and

a first spring member and a second spring member, each of the first and second spring members being contiguous to the second outer surface of the second piston so as to move at least one of the first piston and the second piston along the longitudinal axis.

13. The compensator of claim 12, wherein the first piston comprises an exterior first piston surface confronting the body inner surface so as to provide a controlled clearance that permits fluid communication between the first and second fluid reservoirs.

14. The compensator of claim 12, wherein the first sealing member comprises an O-ring disposed in a groove formed on a peripheral surface of the second piston such that the O-ring is contiguous to the body inner surface.

15. The compensator of claim 12, further comprising a valve disposed in one of the first and second reservoir, the valve being responsive to one of a first fluid pressure in the first fluid reservoir and a second fluid pressure in the second reservoir so as to permit fluid flow from one of the first and second fluid reservoirs to the other of the first and second fluid reservoirs.

16. The compensator of claim 13, wherein the second piston comprises an annulus disposed about the longitudinal axis, the annulus including a first surface proximal the longitudinal axis and a second surface distal therefrom.

17. The compensator of claim 16, further comprising an extension extending through the annulus, the extension having a first end and a second end, the first end being coupled to the first piston and the second end adapted to be coupled to an length-changing actuator, the second end including a first boss portion.

18. The compensator of claim 17, wherein the second sealing member comprises a bellows having first end hermetically coupled to the first surface of the annulus and a second end being coupled to the first boss portion of the extension.

19. The compensator of claim 18, further comprising a fluid passage disposed in one of the first and second pistons, the fluid passage permitting fluid communication between the first and second fluid reservoirs.

20. The compensator of claim 19, wherein the first spring member includes one terminus being coupled to the first boss portion and another terminus contiguous to one of the first and second pistons so as to impart a first spring force to the one of the first and second pistons.

21. The compensator of claim 19, wherein the second spring member includes one terminus engaging a second boss portion coupled to the body and another terminus contiguous to one of the first and second pistons so as to impart a second spring force to the one of the first and second pistons.

22. The compensator of claim 21, wherein the first piston comprises a first surface area in contact with the fluid and the second working surface comprises a second surface area in contact with the fluid such that a resulting force is a function of the sum of the force of the first and second spring members and a ratio of the first surface area to the second surface area.

23. A method of compensating for distortions of a fuel injector, the fuel injector including a housing having an end member, a body having a first body end and a second body end extending along a longitudinal axis, the body having an inner surface facing the longitudinal axis, a compensator having a first piston coupled to an length-changing actuator and disposed in the body proximate one of the first body end and second body end, the first piston having a first outer surface and a first working surface distal to the first outer surface, the first outer surface cooperating with the end member to define a first fluid reservoir in the body, a second piston disposed in the body proximate the first piston

having a second outer surface distal to a second working surface confronting the first working surface of the first piston, a first sealing member coupled to the second piston, a flexible fluid barrier coupled to the first piston and the second piston, the fluid barrier, the first working surface of the first piston and the second working surface of the second piston defining a second fluid reservoir, and a first spring member and a second spring member, the method comprising:

confronting a surface of the first piston to an inner surface of the body so as to form a controlled clearance between the first piston and the body inner surface of the first fluid reservoir;

engaging an elastomer between the working surface of the second piston and the inner surface of the body;

coupling a flexible fluid barrier between the first piston and the second piston such that the second piston, the elastomer and the flexible fluid barrier form the second fluid reservoir;

preloading the second piston with at least one of the first and second spring members so as to generate a hydraulic pressure in the first and second hydraulic reservoirs; and

biasing the length-changing actuator with a predetermined force vector resulting from changes in the volume of hydraulic fluid disposed within the first fluid reservoir as a function of temperature.

24. The method of claim 23, wherein biasing includes moving the length-changing actuator in a first direction along the longitudinal axis when the temperature is above a predetermined temperature.

25. The method of claim 24, wherein the biasing includes biasing the length-changing actuator in a second direction opposite the first direction when the temperature is below a predetermined temperature.